Available online at www.sciencedirect.com
ScienceDirect
ELSEVIER
Applied Animal Behaviour Science 100 (2006) 103–116
APPLIED ANIMAL BEHAVIOUR SCIENCE
www.elsevier.com/locate/applanim

Into the brains of whales☆

Mark Peter Simmonds *

Whale and Dolphin Conservation Society, Brookfield House, St. Paul's Street, Chippenham, Wiltshire, SN 15 1LJ, UK

Available online 15 May 2006

Abstract

Whilst studies on cetaceans have focused on a few populations of just a few species, various complex behaviours and social structures that support the notion that cetaceans should be regarded as intelligent animals have been revealed. The evidence to support this is reviewed here and is best developed for some odontocete species, although recent studies on minke whales show that the behaviour of baleen whales may be more complex than previously thought. As one consequence of high intelligence, the potential impacts of whaling and other removals may be far greater than they appear and a new approach to the conservation of these species – which takes into account their intelligence, societies, culture and potential to suffer – is advocated.
© 2006 Elsevier B.V. All rights reserved.

Keywords: Cetaceans; Dolphins; Whales; Intelligence; Culture; Conservation; Welfare; Management

1. Introduction

The mammalian order Cetacea includes over 80 known species of whales, dolphins and porpoises and is popularly believed to contain some of the most intelligent animals. Although research on cetacean social systems lags some three decades behind equivalent work on primates (Connor et al., 1998), new research and expert analyses of research and behaviour (e.g. Whitehead, 2003; Mann et al., 2000; Connor et al., 1998) mean that, whilst acknowledging the limitations of our present understanding, we can now engage in a well informed consideration of cetacean intelligence, society and culture and attempt to relate our conclusions to urgent conservation and welfare issues.

☆ This paper is part of the special issue entitled Sentience in Animals, Guest Edited by Dr. John Webster.

* Tel.: +44 1249 449 500; fax: +44 1249 449 501.
E-mail address: mark.simmonds@wdcs.org.

0168-1591/$ – see front matter © 2006 Elsevier B.V. All rights reserved.
doi:10.1016/j.applanim.2006.04.015

However, there are a number of significant methodological difficulties involved in evaluating cetacean intelligence. Lusseau and Newman (2004) noted that "animal social networks are substantially harder to study than networks of human beings because they do not give interviews or fill out questionnaires. . ." Consequently, information must be gained by direct observation of individuals and their interactions with conspecifics. However, when studying marine mammals, the practical difficulties and expense involved in observational work are considerable, including the fact that individuals tend to be wide-ranging, fast moving and, in the case of several species, also very deep-diving. This has lead to the development of stringent photo-identification techniques which in recent years have provided an important insight into cetacean social networks. A further complication is the degree to which the cetacean behaviour observable at the sea surface reflects their activities more generally. This is especially true of the deep divers such as the beaked whales of the family Ziiphidae or the cachalots (or sperm whales), *Physeter macrocephalus*, which spend so much of their time in the depths. In the case of the latter in particular, studies at the surface are now being combined with sophisticated acoustic techniques which enable the animals to be monitored underwater, including monitoring particular individuals (Whitehead, 2003).

Another tier of complexity is provided by the likelihood that physically proximate individuals, apparently operating as a distinct group, may actually be in acoustic contact with other more distant animals creating a larger, dispersed social unit that is far more difficult to study. Janik (2000a) recently calculated that wild common bottlenose dolphin, *Tursiops truncatus*, whistles in the Moray Firth, Scotland, could be discernable 20–25 km away (in water of 10 m depth and with a sea state of zero). The larger, louder whales may be in contact across entire ocean basins. In fact, cetaceans predominantly perceive their world using sound and remarkable hearing abilities; a distinction that makes comparison with primates difficult.

Another methodological issue is the anatomical differences between cetaceans and primates. Goold and Goold in *The Animal Mind* (1994) commented "... privately many primatologists (and publicly a few) concede that they assume that their subjects are to some degree self aware. In part this may arise not because primates are so much smarter than others species, but because it is easier for humans to read primate gestures and emotional expressions than the equivalents in, say, beavers or dolphins. It is also easier for us to empathize with behavioural responses to situations that could touch our own lives." Thus they highlight the possibility that our interpretation of cetacean behaviour might be hampered by a lack of empathy which could also have significant implications for conservation priorities and welfare issues.

In terms of behavioural interpretation, the physical differences between primates and cetaceans are significant. For example, whilst the arrangement of bones in the cetacean forelimb is similar to our own, the phalanges are encased within a flipper, which acts as an aqua-foil for lift and steering. Thus they lack the manipulative abilities of primates and cannot gesture or point with the same facility. Similarly, the musculature of their heads prohibits facial expressions, although a few species such as the beluga, *Delphinapterus leucas*, have some 'facial' mobility.

From their work on primates, Russon and Bard (1996) identified the following signs of intelligence: problem solving by insight; tool use/manufacture; imitation; sense of self; pedagogy and culture. This paper reviews the recent key literature and results concerning relevant cetacean attributes in these key areas and, additionally, considers some evidence that suggests emotional responses in cetaceans. It is also worth commenting at the outset that two evolutionary pressures on cetaceans are likely to have resulted in the development of high cognitive functioning: firstly the patchy un-predictable prey resources that they tend to exploit (Rendall and Whitehead, 2001) and, secondly, the cognitive demands of living in complexly bonded social groups (Dunbar, 2003).

Download English Version:

https://daneshyari.com/en/article/6379928

Download Persian Version:

https://daneshyari.com/article/6379928

Daneshyari.com